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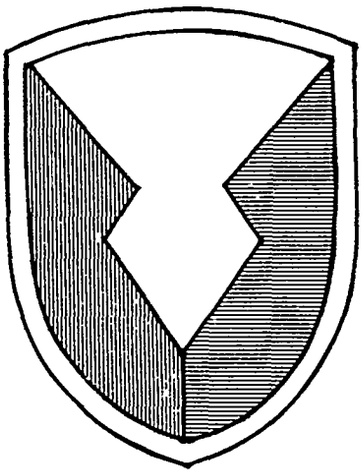

USATECOM PROJECT NO 8-4-1060-03

FINAL REPORT
OF SERVICE TEST
OF
SMOKELESS, FLASHLESS, XM463, 40-MM CARTRIDGE (U)
2 JUNE 1965

US ARMY INFANTRY BOARD

FORT BENNING, GEORGIA

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UNITED STATES ARMY INFANTRY BOARD
Fort Benning, Georiga 31905

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This document has been classified by
authority of letter, AMSTE-BC, USATECOM,
23 June 1964, subject: "Test Directive,
USATECOM Project No 8-4-1060-02, 03, for
ET/ST of the Smokeless, Flashless, XM463,
40-mm Cartridge (U)"

Ruth M. Haerr
RUTH M. HAERR
Major WAC
Adjutant
2 June 1965

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ABSTRACT

1. (U) Type of Test: Service Test.

2. (U) Nomenclature of Test Item: Cartridge, 40-mm, Smokeless, Flashless, XM463.

3. (U) Test Activity Responsibilities: The US Army Infantry Board was responsible for planning, executing, and reporting the service test.

4. (U) Test Location and Duration: Fort Benning, Georgia, from 22 March 1965 to 12 April 1965.

5. (C) Summary:

a. Findings

(1) There was no appreciable difference in position disclosing effects between the test item and the control item during the hours of daylight.

(2) The test item had less position disclosing effects during the hours of darkness.

(3) There was no appreciable difference in accuracy between the test item and the control item.

(4) The test item failed to meet all the requirements of the QMR (see Appendix I, Findings).

b. Conclusions

The US Army Infantry Board concludes that:

(1) The only appreciable advantage of the test item over the control item was a substantial reduction in position disclosing effects during the hours of darkness.

(2) There was no appreciable difference in position disclosing effects between the test item and the control item during the hours of daylight.

(3) There was no appreciable difference in accuracy between the test item and the control item.

(4) The test item is safe for US Army use.

(5) The test item when modified to correct the deficiencies and as many of the shortcomings as feasible, will be suitable for US Army use in the temperate zone and could be used as a replacement for the control item.

c. Recommendations

The US Army Infantry Board recommends that:

(1) The test item be modified to correct the deficiencies and as many as feasible of the shortcomings.

(2) Five hundred modified test items be made available for confirmatory testing.

SECTION 1 -- GENERAL

1.1 (U) REFERENCES (U)

1.1.1 (U) CDOG paragraphs 238c(5), 210a, 212b(2), and 237a(5).

1.1.2 (U) Qualitative Materiel Requirement for Cartridge, 40-mm, Smokeless, Flashless, Noiseless for Launcher, M79.

1.1.3 (U) Report of Project No 2890, USAIB, 20 July 1960, Service Test of Cartridges, 40-mm, XM387, XM406, XM407 (U), as approved by letter, ATDEV-3 471, USCONARC, 31 August 1960, subject: "Report of Project No 2890, Service Test of Cartridges, 40-mm, XM387, XM406, and XM407 (U)."

1.1.4 (U) AMCTC 116 approved 24 September 1962.

1.2 (U) AUTHORITY (U)

Letter, AMSTE-BC, USATECOM, 23 June 1964, subject: "Test Directive, USATECOM Project No 8-4-1060-02, 03C, for ET/ST of the Smokeless, Flashless, XM463, 40-mm Cartridge (U)."

1.3 (U) OBJECTIVES (U)

1.3.1 (U) To determine the degree to which the Cartridge, 40-mm, Smokeless, Flashless, XM463, meets the Qualitative Materiel Requirement (QMR).

1.3.2 (U) To determine the suitability of the Cartridge, 40-mm, Smokeless, Flashless, XM463, for US Army use.

1.4 (U) RESPONSIBILITIES (U)

1.4.1 (U) The US Army Development and Proof Services was responsible for preparing the test plan, executing, and final reporting of the engineering test.

1.4.2 (U) The US Army Infantry Board (USAIB) was responsible for planning, executing, and reporting the service test. The service test included the following tests:

a. Physical Characteristics - Dimensions and weight of complete round as compared to the M406.

b. Known distance accuracy, unknown distance accuracy, transportability, safety, reliability, maximum effective range, and human factors.

c. Position disclosing effects under various light conditions.

d. Comparison with the QMR.

1.5 (C) DESCRIPTION OF MATERIEL (U)

The Cartridge, 40-mm, Smokeless, Flashless, XM463, for the Launcher, Grenade, M79 (M79), hereinafter referred to as the test item, utilizes a cartridge case, XM170, and standard M406 projectile with a propulsion concept designed to result in no smoke or flash when fired from the M79. The cartridge case consists of a modified M118 cartridge case and a telescoped cup made of nickel which has a high elastic limit and low yield strength. Upon firing the projectile from the M79, the gas generated by the propellant (1) expands the cup and Belleville (conic) washer into the obturating groove, thereby retaining the unfolded telescope cup within the cartridge case; and (2) rapidly forces the telescope cup to unfold within the cartridge case, imparting a power stroke to the projectile while containing the smoke and flash.

1.6 (C) BACKGROUND (U)

As a result of service test of Cartridges, 40-mm, XM387, XM406, and XM407, shortcomings such as objectional emission of smoke and flash were reported. In 1962 a QMR was approved which established a requirement for a Cartridge, 40-mm, Smokeless, Flashless, and Noiseless for the Launcher, Grenade, M79. Several approaches were investigated and the expanding bellows technique evolved as having the best potential for containing smoke and flash and reducing the noise level. After a feasibility study and successful launchings of projectiles at the required velocity, the US Army Munitions Command contracted the further development of the cartridge. Developmental firing tests conducted prior to the engineer-service test phase of development indicated that the major design problems had been resolved; therefore, subsequent major emphasis to date has been directed toward an improvement in accuracy.

1.7 (C) FINDINGS (U)

1.7.1 (C) There was no appreciable difference in position disclosing effects between the Cartridge, 40-mm, Smokeless, Flashless, XM463, and the Cartridge, 40-mm, High Explosive, M406, during the hours of daylight.

1.7.2 (C) The Cartridge, 40-mm, Smokeless, Flashless, XM463, had less position disclosing effects during the hours of darkness.

1.7.3 (C) There was no appreciable difference in accuracy between the Cartridge, 40-mm, Smokeless, Flashless, XM463, and the Cartridge, 40-mm, High Explosive, M406.

1.7.4 (U) The Cartridge, 40-mm, Smokeless, Flashless, XM463, met the requirements of the QMR listed in Appendix I, Findings, as paragraphs 1, 4, 5, 8, 9, and 10.

1.7.5 (U) The Cartridge, 40-mm, Smokeless, Flashless, XM463, failed to meet the requirements of the QMR listed in Appendix I, Findings, as paragraphs 2, 3, 6, 7, and 11.

1.7.6 (C) The following deficiencies and shortcomings were noted:

1.7.6.1 (C) DEFICIENCIES (U)

1.7.6.1.1 (U) The expended test item cases are difficult to extract from the M79. (Sub-Test No 6)

1.7.6.1.2 (U) The test item is not easily distinguishable from the control item during the hours of daylight or during the hours of darkness. (Sub-Test No 1)

1.7.6.1.3 (C) The test and control items are not ballistically matched. (Sub-Test No 2)

1.7.6.1.4 (C) The test items, when fired, can be heard at ranges beyond the minimum arming distance of the projectile. (Sub-Test No 3)

1.7.6.2 (C) SHORTCOMINGS (U)

1.7.6.2.1 (U) The weight of the test item exceeds the weight of the control item by .96 ounce. (Sub-Test No 1)

1.7.6.2.2 (U) The maximum effective range of the test item is less than 250 meters. (Sub-Test No 2)

1.7.6.2.3 (C) At ranges of 90 feet the position of a grenadier firing test items is disclosed by smoke. (Sub-Test No 3)

1.7.6.2.4 (C) Paragraph 10, Safety Precautions, of the maintenance package, TM 9-1310-241-12, is inadequate. This paragraph does not explain the results to be expected when an envelope bursts. (Sub-Test No 5)

1.8 (C) CONCLUSIONS (U)

The US Army Infantry Board concludes that:

1.8.1 (C) The only appreciable advantage of the Cartridge, 40-mm, Smokeless, Flashless, XM463, over the Cartridge, 40-mm, High Explosive, M406, was a substantial reduction in position disclosing effects during the hours of darkness.

1.8.2 (C) There was no appreciable difference in position disclosing effects between the Cartridge, 40-mm, Smokeless, Flashless, XM463, and the Cartridge, 40-mm, High Explosive, M406, during the hours of daylight.

1.8.3 (C) There was no appreciable difference in accuracy between the Cartridge, 40-mm, Smokeless, Flashless, XM463, and the Cartridge, 40-mm, High Explosive, M406.

1.8.4 (C) The Cartridge, 40-mm, Smokeless, Flashless, XM463, is safe for US Army use.

1.8.5 (U) The Cartridge, 40-mm, Smokeless, Flashless, XM463, when modified to correct the deficiencies and as many of the shortcomings as feasible, will be suitable for US Army use in the temperate zone and could be used as a replacement for the Cartridge, 40-mm, High Explosive, M406.

1.9 (U) RECOMMENDATIONS (U)

The US Army Infantry Board recommends that:

1.9.1 (U) The Cartridge, 40-mm, Smokeless, Flashless, XM463, be modified to correct the deficiencies and as many as feasible of the shortcomings.

1.9.2 (U) Five hundred modified Cartridges, 40-mm, Smokeless, Flashless, XM463, be made available for confirmatory testing.

SECTION 2 -- DETAILS AND RESULTS OF SUB-TESTS

2.0 (U) INTRODUCTION (U)

2.0.1 (U) TEST SOLDIERS (U)

Soldiers used in this project were representative of those who could be expected to handle, fire, and maintain the test item in the field. When appropriate, test soldiers were equipped with complete field uniforms and equipment. All soldiers involved in the test were instructed as to the objective of this project and the specific objectives of the individual sub-tests in which they participated.

2.0.2 (U) METHOD OF EVALUATION (U)

The service test was conducted at Fort Benning, Georgia, from 22 March 1965 to 12 April 1965. As the testing progressed, all data obtained during the particular sub-test and applicable data from previous sub-tests were analyzed and compared with the QMR [illegible] (QR).

2.0.3 (U) CONTROL ITEM (U)

The standard Cartridge, 40-mm, HE, M406, hereinafter referred to as the control item, was used for control purposes during this test.

2.1 (U) SUB-TEST NO 1, PREOPERATIONAL INSPECTION AND PHYSICAL CHARACTERISTICS (U)

2.1.1 (U) OBJECTIVES (U)

2.1.1.1 (U) To insure that the test items were in proper condition for testing.

2.1.1.2 (U) To determine the dimensions and weight of the test items.

2.1.1.3 (U) To determine if the test item met the following physical characteristics:

a. "The size and shape of the cartridge must permit packaging in the standard ammunition bandoleer." (Ref para 5, App I.)

b. "The cartridge must be easily identifiable by day and night." (Ref para 6, App I.)

c. "The cartridge should not exceed the weight of the Cartridge, 40-mm, HE, M406." (Ref para 7, App I.)

2.1.2 (U) METHOD (U)

2.1.2.1 (U) Upon receipt of the test items the shipping containers were examined for damage. Test items in undamaged containers were examined prior to firing.

2.1.2.2 (U) Ten each of the test and control items were weighed and measured and the average weights and dimensions were computed.

2.1.2.3 (U) The test and control items were photographed.

2.1.2.4 (U) The compatibility of the test item with the standard ammunition bandoleer was determined.

2.1.2.5 (U) Three test items and three control items were placed in a standard ammunition bandoleer. Three test soldiers attempted to identify the test items during daylight and darkness.

2.1.3 (U) RESULTS (U)

2.1.3.1 (U) Upon receipt of the test items the shipping containers were examined and found to be undamaged. During the course of testing, all test items were examined prior to firing and all were found to be undamaged and in suitable condition for testing.

2.1.3.2 (U) The weights and dimensions of the test and control items are depicted in Table I.

TABLE I

WEIGHTS AND DIMENSIONS

	Weight (ounces)	Length (inches)	Diameter (inches)
Test	8.80	3.78	1.62
Control	7.84	3.78	1.62

2.1.3.3 (U) Photographs of the test and control items appear as figures 1 through 5 in Appendix IV.

2.1.3.4 (U) The test items were delivered in standard ammunition bandoleers. The size and shape of the test items were the same as that of the control items and did not adversely affect their being packaged in the standard ammunition bandoleers. (See fig 6 and 7, App IV.)

2.1.3.5 (U) The test item was not easily distinguishable from the control item by day and night. The distinguishing characteristics of the test item were:

a. A groove in the base of the test item not easily discernible by touch. (See fig 3, App IV.)

b. Two indentations in the base of the primer cup not easily discernible by touch. (See fig 3, App IV.)

c. Markings on the base of the test item. (See fig 3, App IV.)

d. A weight variance of approximately 1 ounce. (See Table I.)

2.1.3.6 (U) The markings on the base of the test item did not provide an adequate means of identification during the hours of daylight and were extremely difficult to read during the hours of darkness.

2.1.4 (U) ANALYSIS (U)

2.1.4.1 (U) The test item met the physical characteristics of the QMR enumerated in subparagraph 2.1.1.3a.

2.1.4.2 (U) The test item failed to meet the QMR enumerated in subparagraphs 2.1.1.3b and c for the following reasons:

a. The test item was not easily distinguishable from the control item during the hours of daylight or during the hours of darkness. This is a deficiency.

b. The weight of the test item exceeded the weight of the control item by .96 ounce. This is a shortcoming.

2.2 (C) SUB-TEST NO 2, KNOWN DISTANCE ACCURACY AND MAXIMUM EFFECTIVE RANGE (U)

2.2.1 (C) OBJECTIVE (U)

To determine whether the test item met the following criteria for known distance accuracy and maximum effective range:

a. (C) "The cartridge will be fired in the Launcher, Grenade, M79 without any modifications to the weapon." (Ref para 1, App I.)

b. (C) "Required. The projectile, when fired from the Launcher, Grenade, M79, must achieve a maximum effective range of 375 meters." (Ref para 3, App I.)

c. (C) "Required. The projectile with aimed fire from the Launcher, Grenade, M79 must at least equal the accuracy of the projectile of the Cartridge, 40-mm, HE, M406." (Ref para 4, App I.)

2.2.2 (U) METHOD (U)

2.2.2.1 (U) Three grenadiers each fired a 20-round shot group of the control item at ranges of 150, 200, 250, 300, 350, 375, and 400 meters from an M79 grenade launcher. Each grenadier zeroed his weapon at each range prior to firing this exercise.

2.2.2.2 (U) The range probable error, deflection probable error, range to center of impact, and the maximum spread of each shot group were determined.

2.2.2.3 (U) Three grenadiers each fired a 20-round shot group of the test item at a vertical 4-foot by 4-foot window frame at a range of 100 meters. Target hits and misses were recorded.

2.2.2.4 (U) The above exercises were repeated using the test (control) item.

2.2.3 (C) RESULTS (U)

2.2.3.1 (C) The results of the firing described in paragraph 2.2.2 are depicted in Tables II and III.

TABLE II

Accuracy (Horizontal Target)

Range (Meters)	Data	Firer No 1		Firer No 2		Firer No 3		Average	
		Control(1) Item	Test Item	Control(1) Item	Test Item	Control(1) Item	Test Item	Control Item	Test Item
150	Range Probable Error (feet)	13.9	10.4	12.9	10.9	11.2	9.3	12.7	10.2
	Deflection Probable Error (feet)	1.5	1.1	1.9	1.3	.7	1.1	1.4	1.2
	Maximum Spread (feet)	104.5	52.6	66.0	55.5	57.5	69.0	76.0	59.0
	Range to Center of Impact (meters)	148.8	150.5	149.3	140.7	147.9	154.2	148.7	148.5
200	Range Probable Error (feet)	16.5	(2) 11.1	13.1	9.8	13.2	8.0	14.3	9.6
	Deflection Probable Error (feet)	1.4	1.7	1.6	1.8	1.3	1.6	1.4	1.7
	Maximum Spread (feet)	108.7	65.1	82.1	49.1	80.0	40.0	90.3	51.4
	Range to Center of Impact (meters)	205.8	201.9	199.0	205.2	198.1	201.9	201.0	203.0
250	Range Probable Error (feet)	16.6	14.2	33.6	(2) 23.3	14.1	12.3	21.4	16.6
	Deflection Probable Error (feet)	2.1	3.0	5.5	8.2	2.0	2.8	3.1	4.7
	Maximum Spread (feet)	85.6	92.8	207.2	131.9	70.0	65.6	120.9	96.8
	Range to Center of Impact (meters)	256.4	262.3	258.8	270.4	243.8	253.9	253.0	262.2
300	Range Probable Error (feet)	18.1	13.0	13.6	24.4	12.1	22.5	14.6	20.0
	Deflection Probable Error (feet)	3.5	3.8	5.1	4.1	1.7	3.6	3.4	3.8
	Maximum Spread (feet)	104.4	85.4	94.4	135.0	67.1	91.1	88.6	103.8
	Range to Center of Impact (meters)	293.8	302.7	293.2	286.7	303.0	310.6	296.7	300.0

TABLE II (cont)

Range (Meters)	Data	Firer No 1 Control(1) Item	Firer No 1 Test Item	Firer No 2 Control(1) Item	Firer No 2 Test Item	Firer No 3 Control(1) Item	Firer No 3 Test Item	Average Control Item	Average Test Item
350(3)	Range Probable Error (feet)	16.7	(2) (4) 18.8	16.8	(2) (4) 15.7	18.4	(4) 15.6	17.3	16.7
	Deflection Probable Error (feet)	4.4	6.5	2.8	9.2	5.1	5.1	4.1	6.9
	Maximum Spread (feet)	87.8	120.4	92.2	86.3	95.6	88.7	91.9	98.5
	Range to Center of Impact (meters)	350.5	361.4	350.5	362.5	346.8	354.3	349.3	359.4
375(3)	Range Probable Error (feet)	19.6	26.3	21.6	15.7	25.9	15.6	22.4	19.2
	Deflection Probable Error (feet)	5.5	5.5	6.4	10.0	6.2	6.8	6.0	7.4
	Maximum Spread (feet)	113.5	128.6	99.5	80.0	152.6	81.6	121.9	96.7
	Range to Center of Impact (meters)	362.7	373.7	367.7	380.0	346.0	384.3	358.8	379.3
400(3)	Range Probable Error (feet)	21.5	36.2	19.9	15.0	28.0	26.0	23.1	25.7
	Deflection Probable Error (feet)	10.7	8.8	7.1	11.8	4.5	4.5	7.4	8.4
	Maximum Spread (feet)	116.8	183.9	103.1	76.2	155.0	132.8	125.0	131.0
	Range to Center of Impact (meters)	378.0	389.0	376.4	404.5	356.5	387.8	370.3	393.8

(1) At each range, the M79's were first zeroed with control items and the exercise then fired with control items. A test item was then fired to confirm the zero of the M79 (weapons were rezeroed with test items where indicated). Then the exercise was fired with test items.
(2) M79's were rezeroed with test items prior to firing exercise.
(3) Firers at these ranges used sandbags for support of the M79.
(4) The test item was fired the day following that on which the control item was fired.

TABLE III

ACCURACY (VERTICAL TARGET) (1)

Cartridge	Number of Hits Out of Twenty		
	Firer No 1	Firer No 2	Firer No 3
Test Item (2)	11	5	20
Control Item	14	10	17

(1) The grenadiers used hold-off when firing this exercise.

(2) The test item was fired first.

2.2.3.2 (C) The test items were fired from the M79 without any modification to the weapon.

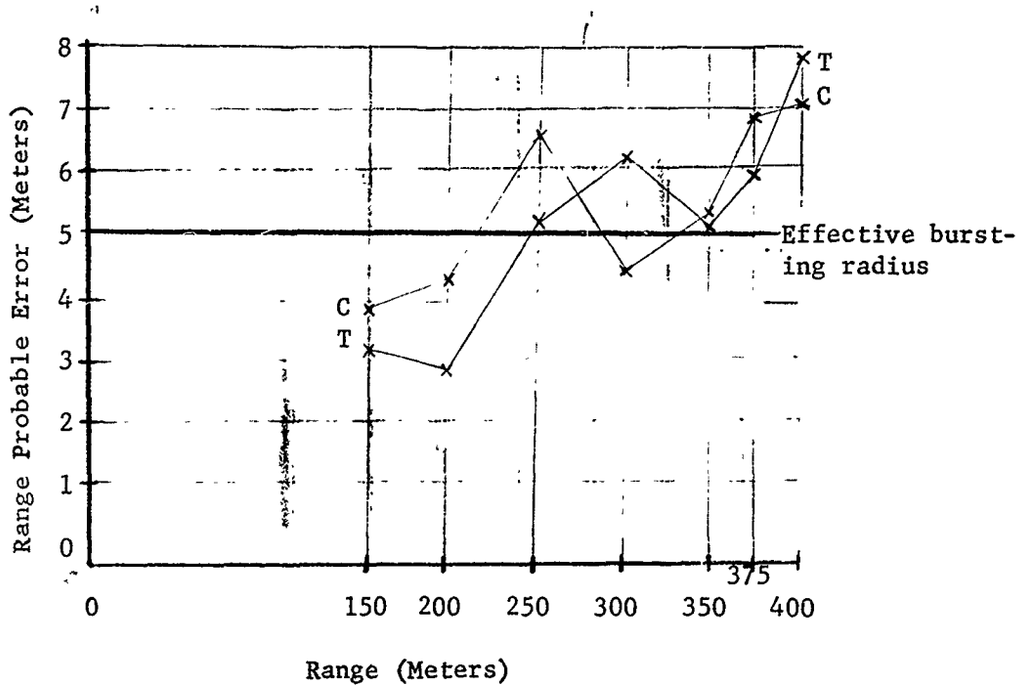
2.2.3.3 (C) The projectile of the test item fired in the M79 achieved an average range of 393.8 meters to center of impact when fired at targets at a range of 400 meters as indicated in Table II. A number of individual projectiles impacted beyond 400 meters.

2.2.3.4 (C) The accuracy of the projectile of the test item, when fired with aimed fire from the M79, was better than the accuracy of the projectile of the control item for most exercises when fired from the same weapon under the same conditions. (See Tables II and IV.)

2.2.3.5 (C) With respect to the maximum effective range of the test item, it should be noted that no definitive criteria were stated in the QMR against which measurements could be made. Therefore, the criteria of one range probable error attained in the exercise specified in paragraph 2.2.2.1 and the effective bursting radius (5 meters) of the projectile were used as a measure of effectiveness. Using this measure, neither the test nor the control item achieved a maximum effective range of 375 meters. Beyond 200 meters the range probable error attained with both the test and control cartridges exceeded the effective bursting radius in varying degrees, as depicted in Table IV, with a single exception.

TABLE IV

EFFECTIVE RANGES



Notation: T - Test Item

C - Control Item

2.2.3.6 (C) During the conduct of the exercise specified in paragraph 2.2.2.1, it should be noted that after zeroing and firing with control items, grenadiers sometimes found it necessary to rezero with test items to fire the same exercise at the same range. In those cases where grenadiers did not rezero their M79's, the difference in center of impact of the test and control items indicated that the test item achieved greater range with the same sight setting, as depicted in Table V. In those cases where the grenadier rezeroed his M79, the data were invalid for determining ballistic match; however, the tendency with the rezeroed M79's appeared to be to shoot long as when the M79's were not rezeroed. It should be noted that grenadiers were constantly adjusting their fire during this exercise in an attempt to get as close as possible to the target. This tended to minimize the distance between the centers of impact of the test items and the control items resulting in an indication in Table V of less of a ballistic mismatch than actually exists. Hence, the figures in Table V indicate a ballistic mismatch but are not to be taken as definitive.

TABLE V

BALLISTIC MATCH

Range (Meters)	Distance (meters along the Y axis) Between Center of Impact (Test with Respect to Control Items)		
	Firer No 1	Firer No 2	Firer No 3
150	+ 1.7	- 8.6	+ 6.3
200	- 3.9 (1)	+ 6.2	+ 3.8
250	+ 5.9	+11.6 (3)	+10.1
300	+ 8.9	+ 6.5	+ 7.6
350	+10.9 (2)	+12.0 (2)	+ 7.5 (4)
375	+11.0	+12.3	+38.3
400	+11.0	+28.1	+31.3

(1) M79 rezeroed prior to firing of test items (dropped sight 2 clicks).

(2) Test items fired the morning following the same exercise with control items and the M79 required rezeroing.

(3) Grenadier unable to zero M79 with test item. Grenadier changed to zero weapon. Original grenadier fired for record.

(4) Test items fired the morning following the same exercise with control items. The M79 did not require rezeroing.

2.2.3.7 (C) The expanding gases were not retained by the developing envelope in .57 percent of the test items fired, resulting in the projectile impacting 50 to 100 meters beyond the intended target. (See figures 8 and 9, Appendix IV.) In each of these cases, an additional test item was fired by the grenadier and the long round was not computed in the score. One instance was noted when the envelope allowed the gas to escape, but the envelope did not burst. This test item impacted in the target area.

2.2.3.8 (C) No definitive conclusions can be drawn from the data obtained in Table III since the results of firing at verticle point targets depend upon the ability of individual grenadiers to apply hold-off. This ability generally improves with each repetition of an exercise. A larger sample size of test and control items and targets is necessary to obtain valid data.

2.2.4 (C) ANALYSIS (U)

2.2.4.1 (C) There was no appreciable difference in accuracy between the test item and the control item.

2.2.4.2 (U) The test item met the QMR enumerated in subparagraphs 2.2.1a and c.

2.2.4.3 (C) The test item failed to meet the QMR enumerated in subparagraph 2.2.1b for the following reason: The maximum effective range of the test item is less than 250 meters. This is a shortcoming.

2.2.4.4 (C) The test and control items were not ballistically matched. This is a deficiency.

2.3 (C) SUB-TEST NO 3, POSITION DISCLOSING EFFECTS (U)

2.3.1 (C) OBJECTIVE (U)

To determine whether the test item met the following criteria:

a. "***the position of the firer must not be disclosed by either flash or smoke***." (Ref para 2, App I.)

b. "***the noise must not be audible at ranges beyond the minimum arming distance of the projectile***." (Ref para 2, App I.)

2.3.2 (U) METHOD (U)

2.3.2.1 (U) Prior to the conduct of this sub-test, the eyes and ears of all observers were medically examined and no disqualifying defects were noted.

2.3.2.2 (U) During the conduct of Sub-Test No 2, four observers were placed, two on each flank of the launcher position, in succession, at ranges of 90 feet and 100, 200, and 300 meters to observe the smoke, flash, and noise effects of the test and control item.

2.3.2.3 (U) In addition to the firing in Sub-Test No 2, 50 rounds of the test item and control item were fired during the hours of darkness. Smoke, flash, and noise effects were observed as in paragraph 2.3.2.2.

2.3.3 (C) RESULTS (U)

2.3.3.1 (C) The results of observations made as prescribed in paragraphs 2.3.2.2 and 2.3.2.3 are depicted in Tables VI and VII. The amount of smoke, flash, and noise was rated from 0 to 5. A rating of zero indicates that there was no smoke, flash, or noise, and a rating of 5 indicates that there was a great deal of smoke or flash or that the noise was sharp and loud.

TABLE VI

POSITION DISCLOSING EFFECTS (DAYLIGHT)

Observer No	Range of Observer from Firing Line	Cartridge	Number of Ratings Indicated Under Appropriate Column																				
			Smoke							Flash							Noise						
			Not Observed	0	1	2	3	4	5	Not Observed	0	1	2	3	4	5	Not Observed	0	1	2	3	4	5
1	90 Feet	Test	26	20	14					1	59						1				59		
1	90 Feet	Control	33		12	15					60										60		
2	90 Feet	Test		3	57						60										60		
2	90 Feet	Control				60					60												60
3	90 Feet	Test	17	26	16	1					60										60		
3	90 Feet	Control	17		29	14					60										60		
4	90 Feet	Test	17		60						60									60			
4	90 Feet	Control						60			60											60	
1	100 Meters	Test	14	46						15	45										60		
1	100 Meters	Control	14	46						15	45										60		
2	100 Meters	Test		60							60												60
2	100 Meters	Control		60							60												60
3	100 Meters	Test	13	47						12	48										60		
3	100 Meters	Control	12	48						12	48										60		
4	100 Meters	Test		60							60										60		
4	100 Meters	Control		60							60										60		
1	200 Meters	Test	17	42	1					22	38									60			
1	200 Meters	Control	23		31					21	39									60			
2	200 Meters	Test		60							60									60			
2	200 Meters	Control			60						60									60			
3	200 Meters	Test	15	45							60									60			
3	200 Meters	Control	9	6	41	4					60									60			
4	200 Meters	Test		60							60								60				
4	200 Meters	Control			60						60									60			
1	300 Meters	Test	29	31						29	31								60				
1	300 Meters	Control	26	34						3	57								60				
2	300 Meters	Test		60							60								60				
2	300 Meters	Control		60							60								60				
3	300 Meters	Test		60							60								60				
3	300 Meters	Control	2	58						2	58						2		58				
4	300 Meters	Test		60							60								60				
4	300 Meters	Control		60							60								60				

TABLE VII

POSITION DISCLOSING EFFECTS (DARKNESS)

Observer No	Range of Observer from Firing Line	Cartridge	Number of Ratings Indicated Under Appropriate Column																				
			Smoke							Flash							Noise						
			Not Observed	0	1	2	3	4	5	Not Observed	0	1	2	3	4	5	Not Observed	0	1	2	3	4	5
1	90 Feet	Test		15										15							15		
1	90 Feet	Control		15										15							15		
2	90 Feet	Test		15							15												15
2	90 Feet	Control		15							3		12										15
3	90 Feet	Test		15							15										15		
3	90 Feet	Control		15										15							15		
5	90 Feet	Test		15							15											15	
5	90 Feet	Control		15										13	2						3	12	
1	100 Meters	Test		15							15										15		
1	100 Meters	Control		15									15								15		
2	100 Meters	Test		15							15												15
2	100 Meters	Control		15									15										15
3	100 Meters	Test		15							15										15		
3	100 Meters	Control		15									15								15		
5	100 Meters	Test		15							15										15		
5	100 Meters	Control		15									15								15		
1	200 Meters	Test		15							15									15			
1	200 Meters	Control		15									15							15			
2	200 Meters	Test		15							15												
2	200 Meters	Control		15									15										
3	200 Meters	Test		15							15									15			
3	200 Meters	Control		15								15								15			
5	200 Meters	Test		15							15										15		
5	200 Meters	Control		15									15								15		
1	300 Meters	Test		15							15									15			
1	300 Meters	Control		15							15									15			
2	300 Meters	Test		15							15												15
2	300 Meters	Control		15								13	2										15
3	300 Meters	Test		15							15									15			
3	300 Meters	Control		15								15								15			
5	300 Meters	Test		15							15									15			
5	300 Meters	Control		15								15								15			

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2.3.3.2 (C) The data depicted in Table VI indicate that:

a. Smoke was observed out to 90 feet (once at 200 meters) from the M79's firing test items but the frequency of observation of smoke and the amount of smoke observed was less than that observed from the M79's firing the control item. Smoke was observed out to 200 meters from the M79's firing control items.

b. No flash was observed from M79's firing either the test or the control item.

c. At ranges of less than 200 meters, the report of the M79's firing test items was slightly less than the report from M79's firing control items. At ranges of 200 meters and beyond, the report of the M79's firing test items was the same as that of M79's firing control items.

2.3.3.3 (C) The data depicted in Table VII indicate that flash was observed at all ranges from M79's firing control items and no flash was observed from M79's firing test items.

2.3.4 (C) ANALYSIS (U)

2.3.4.1 (C) There was no appreciable reduction in position disclosing effects between the test item and the control item during the hours of daylight.

2.3.4.2 (C) The test item had less position disclosing effects during the hours of darkness.

2.3.4.3 (C) The test item failed to meet the QMR enumerated in subparagraphs 2.3.1a and b for the following reasons:

a. At ranges of 90 feet the position of a grenadier firing test items was disclosed by smoke. This is a shortcoming.

b. The test items, when fired, could be heard at ranges beyond the minimum arming distance (48.2 feet) of the projectile. This is a deficiency..

2.4 (U) SUB-TEST NO 4, DURABILITY AND TRANSPORTABILITY (U)

2.4.1 (U) OBJECTIVE (U)

To determine if the test item met the following criteria for durability and transportability:

a. "The ammunition must withstand transport in its shipping container in standard vehicles, cross-country, and over rough terrain." (Ref para 8, App I.)

b. "The ammunition must withstand drop from aircraft by standard means***." (Ref para 9, App I.)

2.4.2 (U) METHOD (U)

2.4.2.1 (U) Throughout all tests, data pertaining to the durability and transportability of the test item were observed.

2.4.2.2 (U) Three combat-equipped soldiers, each carrying six rounds in ammunition pouches and two bandoleers of the test and control items, marched cross-country for 5 miles under simulated combat conditions.

2.4.2.3 (U) The ammunition carried above was attached to each of three individual parachutists who then participated in a parachute jump.

2.4.2.4 (U) At the completion of the above exercises, the test and control items used were inspected for damage and, none being apparent, were then fired at a range of 200 meters in conjunction with Sub-Test No 2. Measurements were taken for the determination of range probable error, deflection probable error, maximum spread, and range to center of impact of each of six 9-round shot groups and compared with the applicable portion of Sub-Test No 2.

2.4.2.5 (U) Shipping containers both full and partially full of the test and control items were loaded on a Carrier, Personnel, Full Tracked: Armored, M113, and Truck, Utility, ¼ Ton, M151, and transported cross-country and over rough terrain for a distance of 50 miles.

2.4.2.6 (U) At the completion of the above exercises the test and control items and the containers were examined and any damage noted. The exercise conducted in 2.4.2.4 was repeated using test and control items from these containers.

2.4.3 (U) RESULTS (U)

No test or control items were damaged nor was the accuracy of either affected as a result of the testing prescribed in paragraph 2.4.2.

2.4.4 (U) ANALYSIS (U)

The test item met the QMR enumerated in Subparagraphs 2.4.1a and b.

2.5 (U) SUB-TEST NO 5, UNKNOWN DISTANCE ACCURACY (U)

2.5.1 (U) OBJECTIVE (U)

To determine the accuracy of the test item when the range to the target is unknown to the grenadier.

2.5.2 (U) METHOD (U)

2.5.2.1 (U) Eight type "E" silhouette targets were placed at ranges varying from 75 to 350 meters from the firing point with two targets placed in each 100-meter range span.

2.5.2.2 (U) Each of three grenadiers zeroed his weapon at a range of 200 meters prior to engaging the targets located at ranges unknown to the grenadiers. Each grenadier was allocated three rounds to engage each target and was allowed to adjust sights between rounds.

2.5.2.3 (U) The time required by each grenadier to estimate the range and fire three shots at the target was recorded.

2.5.2.4 (U) The number and percent of hits within 5-meter and 10-meter radii circles around the target were recorded.

2.5.2.5 (U) The above exercises were repeated using the control item.

2.5.2.6 (U) The above exercises were conducted twice, once firing the test item and then the control item, in that order, and the second time in the opposite order.

2.5.3 (C) RESULTS (U)

The results of the firing prescribed by paragraph 2.5.2 are depicted Tables VIII and IX.

TABLE VIII

UNKNOWN DISTANCE ACCURACY
(Test Item Fired First)

Range (Meters)	Number of Hits in Circle with Radius of 5 or 10 Meters as Indicated*									
	Firer No 1				Firer No 2				Firer No 3			
	Test Item		Control Item		Test Item		Control Item		Test Item		Control Item	
	5	10	5	10	5	10	5	10	5	10	5	10
75	0	0	1	2	0	0	0	0	1	0	3	0
100	0	0	1	1	0	0	1	1	0	0	1	0
125	0	0	0	1	0	0	0	1	0	0	0	1
175	1	0	0	1	0	0	0	0	0	0	0	0
250	0	1	0	0	0	0	0	0	0	0	0	0
275	0	0	1	0	0	0	0	0	0	0	2	0
325	0	0	0	0	0	1	0	0	0	0	0	0
350	0	0	0	0	0	0	0	0	0	0	1	0
TOTAL HITS	1	1	3	5	0	1	1	2	1	0	7	1
Total Time min/sec	6:06		7:50		7:31		6:29		6:39		7:15	

*Numbers of hits in the circle with a radius of 10 meters exclude those landing in the circle with a radius of 5 meters.

TABLE IX

UNKNOWN DISTANCE ACCURACY
(Control Item Fired First)

Range (Meters)	Number of Hits in Circle with Radius of 5 or 10 Meters as Indicated*									
	Firer No 1				Firer No 2				Firer No 3			
	Control Item		Test Item		Control Item		Test Item		Control Item		Test Item	
	5	10	5	10	5	10	5	10	5	10	5	10
75	2	0	1	0	0	1	0	0	0	0	0	0
100	1	0	0	0	0	0	1	0	0	0	0	0
125	1	0	0	0	0	0	0	1	0	0	0	0
175	1	1	1	0	0	0	0	0	0	0	2	0
250	0	0	1	0	0	0	0	0	0	1	0	0
275	0	0	0	0	0	0	0	0	0	0	0	0
325	0	0	0	0	0	0	0	0	0	0	0	2
350	0	0	0	0	0	1	0	0	0	1	0	0
TOTAL HITS	5	1	3	0	0	2	1	1	0	2	2	2
Total Time min/sec	7:05		7:15		6:19		5:55		5:45		6:05	

*Numbers of hits in the circle with a radius of 10 meters exclude those landing in the circle with a radius of 5 meters.

2.5.4 (C) ANALYSIS (U)

No definitive conclusions can be drawn from the results of firing depicted in Tables VIII and IX since the results of firing at targets of unknown ranges depend upon the ability of individual grenadiers to estimate range. The ability of grenadiers to effectively fire on such targets generally improves as they become familiar with the target layout. A larger sample size of test and control items is necessary to obtain valid data.

2.6 (C) SUB-TEST NO 6, SAFETY (U)

2.6.1 (C) OBJECTIVES (U)

2.6.1.1 (U) To determine if the test item was safe for service usage.

2.6.1.2 (C) To determine if the test item met the following criteria:

"The expended cartridge case must be safe for handling and disposal." (Ref para 10, App I.)

2.6.2 (U) METHOD (U)

2.6.2.1 (U) Throughout all testing, data were compiled on any unsafe features of the test item, including the expended cartridge case.

2.6.2.2 (U) Throughout all firing the frequency of duds, short rounds, or unusual distances reached by projectile fragments was recorded.

2.6.2.3 (U) Safety instructions were reviewed to determine adequacy.

2.6.2.4 (U) Special attention was given to any rupture of the envelope at the time of firing.

2.6.3 (C) RESULTS (U)

2.6.3.1 (C) Duds occurred with a frequency of .91 percent with the test item and .32 percent with the control item, both of which are within the rate of 10 failures per 300 rounds specified in Military Specification M406. There were no short rounds of either the test or the control items. There was no indication that projectile fragments traveled an unusual distance from the point of detonation.

2.6.3.2 (C) The safety release received for this service test was adequate and contained a discussion of the results to be expected when an envelope bursts. The maintenance package, TM 9-1310-241-12, is inadequate with respect to paragraph 10, Safety Precautions. This paragraph does not explain the results to be expected when an envelope bursts. Although the bursting of an envelope creates no hazard to the grenadiers

beyond the discomfort of increased recoil, the increased range of the projectile might, under some conditions, present a safety hazard. Both of these factors should be explained in the maintenance package.

2.6.3.3 (C) A failure of the envelope occurred 5 times out of a total of 883 test items fired (.57 percent) (fig 6 and 7, App IV), resulting in the projectile traveling 50 to 100 meters beyond the intended target area. In addition, grenadiers reported that the recoil of the weapon was doubled when the envelope of the test item burst. The additional range of projectiles fired from the test items whose envelopes had burst did not constitute a safety hazard. The increased recoil was a discomfort to grenadiers but not a safety hazard.

2.6.3.4 (C) Data obtained from firing conducted throughout all testing indicated that the test item is safe for service usage. The expended cartridge cases were safe for handling and disposal.

2.6.4 (C) ANALYSIS (U)

2.6.4.1 (U) The test item met the QMR enumerated in subparagraph 2.6.1.2.

2.6.4.2 (C) Paragraph 10, Safety Precautions, of the maintenance package, TM 9-1310-241-12, is inadequate. This paragraph does not explain the results to be expected when an envelope bursts. This is a shortcoming.

2.7 (C) SUB-TEST NO 7, HUMAN FACTORS ENGINEERING (U)

2.7.1 (U) OBJECTIVE (U)

To determine if the test item met the following criteria:

"Required. The design must conform with human factors engineering." (Ref para 11, App I.)

2.7.2 (U) METHOD (U)

2.7.2.1 (U) Throughout all tests, data reflecting on human factors engineering of the test item were compiled.

2.7.2.2 (U) Special attention was given to recoil effects of the test item.

2.7.3 (C) RESULTS (U)

2.7.3.1 (C) The expended test item cases were difficult in varying degrees to extract from the M79. Between 1 and 2 percent of the test item cases had

to be removed by using a rod inserted through the muzzle of the weapon. Approximately 25 percent of the test item cases could be removed by the grenadier without special devices only with great difficulty. In addition, the majority of test item cases were to some extent more difficult to extract than the expended control item cases.

2.7.3.2 (C) Grenadiers reported that the recoil experienced in firing the test item from the M79 was greater than that from the control item. The greater recoil experienced by the grenadiers from the test item may have been due to the fact that the impulse imparted to the projectile of the test item is imparted in a stroke of about 1½ inches (the linear expansion of the envelope) resulting in a "sharper" recoil than that experienced from the control item whose projectile receives its impulse throughout the length of the barrel. The increased recoil experienced when the envelope of the test item bursts caused minor discomfort to the grenadier. The rate of occurrence (.57 percent) is not significant from a human factors engineering standpoint.

2.7.3.3 (U) The difficulty of distinguishing between test and control items during the hours of darkness is discussed in detail in Sub-Test No 1.

2.7.4 (C) ANALYSIS (U)

The test item failed to meet the QMR enumerated in paragraph 2.7.1 for the following reasons:

a. The expended test item cases were difficult to extract from the M79. This is a deficiency.

b. The test item was not easily identifiable during the hours of daylight or during the hours of darkness. This is a previously noted deficiency.

2.8 (U) SUB-TEST NO 8, VALUE ANALYSIS (U)

2.8.1 (U) OBJECTIVE (U)

To determine if the test item contained any features which are unnecessary, costly, or nice to have in accordance with USATECOM Regulation 700-1, 15 June 1964.

2.8.2 (U) METHOD (U)

Throughout all testing, observations were made to determine, and test soldiers were instructed to report, any nonessential or nice-to-have

features which could be modified or deleted without compromising the durability, reliability, or performance of the test item.

2.8.3 (U) RESULTS (U)

No nonessential or nice-to-have features which could be modified or deleted without compromising the durability, reliability, or performance of the test item were noted.

2.8.4 (U) ANALYSIS (U)

Not applicable.

SECTION 3 -- APPENDICES

APPENDIX I -- FINDINGS

Requirement	Comment
1. (C) "The cartridge will be fired in the Launcher, Grenade, M79 without any modifications to the weapon."	Requirement met. Sub-Test No 2.
2. (C) "The position of the firer must not be disclosed by either flash or smoke. ***the noise must not be audible at ranges beyond the minimum arming distance of the projectile."	Requirement not met. Sub-Test No 3.
3. (C) "Required. The projectile, when fired from the Launcher, Grenade, M79 must achieve a maximum effective range of 375 meters."	Requirement not met. Sub-Test No 2.
4. (C) "Required. The projectile with aimed fire from the Launcher, Grenade, M79 must at least equal the accuracy of the projectile of the Cartridge, 40mm, HE, M406."	Requirement met. Sub-Test No 2.
5. (U) "The size and shape of the cartridge must permit packaging in the standard ammunition bandoleer."	Requirement met. Sub-Test No 1.
6. (U) "The cartridge must be easily identifiable by day and night."	Requirement not met. Sub-Test No 1.
7. (U) "Desired. The cartridge should not exceed the weight of the Cartridge, 40mm, HE, M406."	Requirement not met. Sub-Test No 1.
8. (U) "Required. ***The ammunition must withstand transport in its shipping container in standard vehicles, cross-country, and over rough terrain."	Requirement met. Sub-Test No 4.
9. (U) "Required. ***The ammunition must withstand drop from aircraft by standard means***."	Requirement met. Sub-Test No 4.
10. (C) "The expended cartridge case must be safe for handling and disposal."	Requirement met. Sub-Test No 5.
11. (U) "Required. The design must conform with human factors engineering."	Requirement not met. Sub-Tests No 1 and 6.

APPENDIX II -- DEFICIENCIES AND SHORTCOMINGS

1. DEFICIENCIES

DEFICIENCIES	SUGGESTED CORRECTIVE ACTION	REMARKS
1. (C) The expended test item cases were difficult to extract from the M79. Sub-Test No 7.	Adjust the dimensions of the telescoping envelope so that in its telescoped position its diameter will be compatible with the diameter of the bore of the M79.	EFR No KL-2.
2. (U) The test item is not easily identifiable during the hours of daylight or during the hours of darkness. Sub-Test No 1.	The rim of the test item case should be serrated to distinguish the test item from all other 40-mm cartridges.	
3. (C) The test and control items are not ballistically matched. Sub-Test No 2.	Unknown.	
4. (C) The test items, when fired, can be heard at ranges beyond the minimum arming distance of the projectile. Sub-Test No 3.	Unknown.	

2. SHORTCOMINGS

SHORTCOMINGS	SUGGESTED CORRECTIVE ACTION	REMARKS
5. (U) The weight of the test item exceeds the weight of the control item by .96 ounce. Sub-Test No 1.	Unknown.	
6. (U) The maximum effective range of the test item is less than 250 meters. Sub-Test No 2.	Unknown.	

SHORTCOMING	SUGGESTED CORRECTIVE ACTION	REMARKS
7. (C) At ranges of 90 feet the position of a grenadier firing test items was disclosed by smoke. Sub-Test No 3.	Unknown.	
8. (C) Paragraph 10, Safety Precautions, of the maintenance package, TM 9-1310-241-12, is inadequate. This paragraph does not explain the results to be expected when an envelope bursts. Sub-Test No 6.	Include the necessary subparagraph in paragraph 10 to explain the increased recoil and range to be expected when an envelope bursts.	

APPENDIX III -- COORDINATION

US Army Infantry School

(C) The US Army Infantry School concurs subject to the following comments:

a. Comment: "Change all references stating 'effective bursting radius (5 meters)' to read effective casulaty radius.

"(This is the proper term for use with 40-mm Ammunition.)"

Consideration: Concur except that the parenthetical "(5 meters)" be retained.

b. Comment: Reference paragraph 1.7.6.2.2: "Change this paragraph to a deficiency.

"(The QMR states that the projectile must achieve a maximum effective range of 375 meters. A maximum effective range of 250 meters as indicated in this Report of Test is not acceptable and should be classified as a deficiency. This finding statement is not in consonance with paragraph 1.7.3 and is explained to some degree in paragraph 2.2.3.5)."

Consideration: Nonconcur. Neither the test nor the control item achieved a maximum effective range of 375 meters. The accuracy of the test item was comparable to that of the control item (see paragraph 2.2.3.5 and Table IV). The referenced finding statement is in consonance with paragraph 1.7.3.

c. Comment: Reference paragraph 2.2.4.3: "Change to read '***less than 250 meters. This is a deficiency.'"

Consideration: Nonconcur. See consideration of b.

d. Comment: Reference Appendix I, paragraph 11: "Change Comment to read: 'Requirement not met. Sub-Test No 7.'

"(Accuracy.)"

Consideration: Concur.

e. Comment: Reference Appendix II, paragraph 6: "Change this paragraph to a deficiency."

Consideration: Nonconcur. See consideration of b.

US Army Combat Developments Command Infantry Agency

(U) The US Army Combat Developments Command Infantry Agency concurs subject to the following comments:

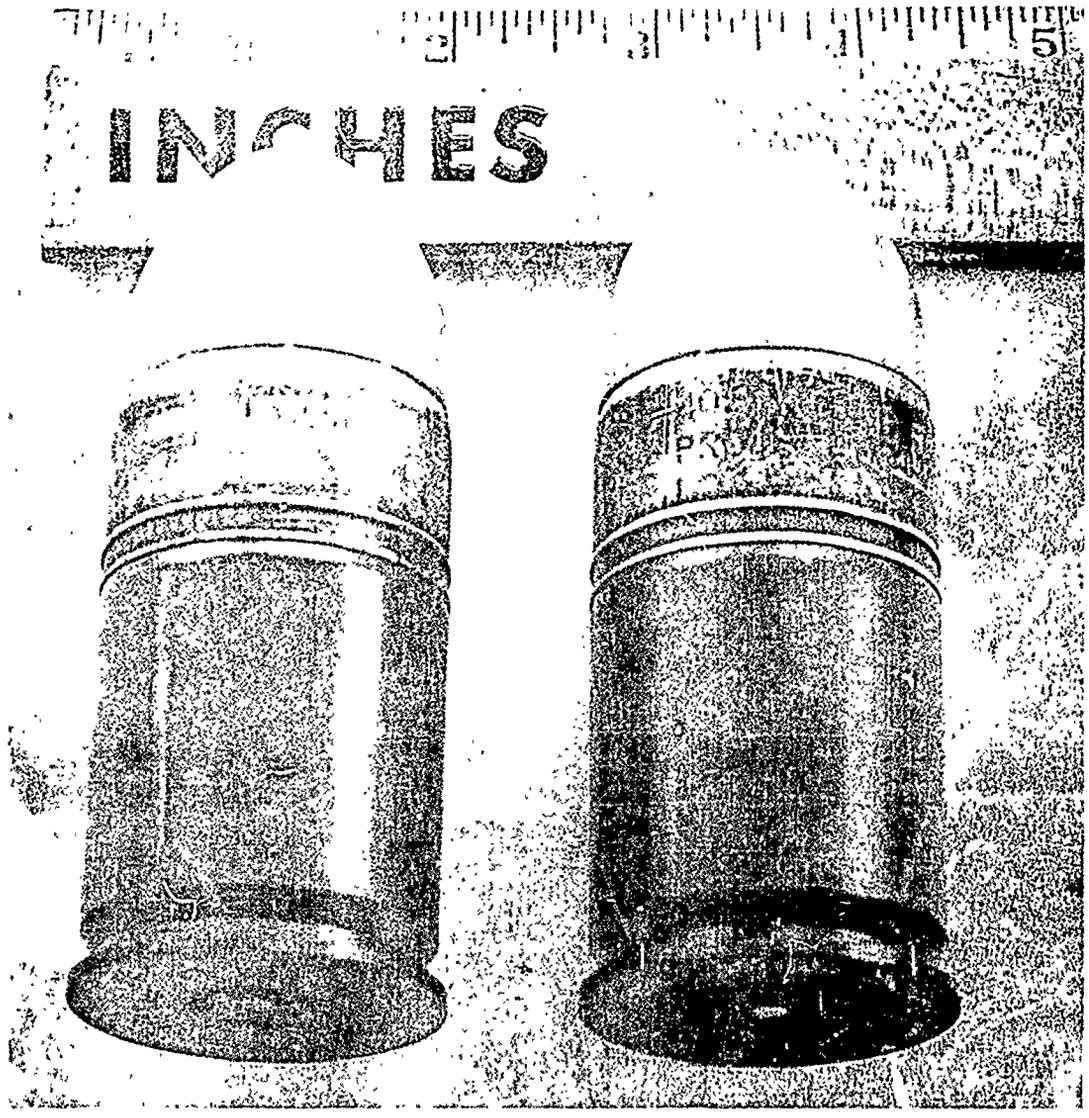
a. Comment: "This agency is of the opinion that the test item possesses no significant advantage over the control item in qualities of being smokeless, flashless or noiseless and therefore is unsuitable for general US Army use as a replacement for or as a supplement to standard 40mm cartridges."

Consideration: Nonconcur. The test item provides a substantial reduction in position disclosing effects during the hours of darkness through the elimination of flash. In addition, the conclusion in paragraph 1.8.5 specifies that suitability of the test item is dependent upon correction of the deficiencies, and as many of the shortcomings as feasible.

b. Comment: "During the coordination of the test results within US Army Combat Developments Command, the Infantry Agency will recommend that the item not be type classified but to return the item to engineering development for further study and development toward meeting the military characteristics as stated in the approved QMR."

Consideration: Concur.

APPENDIX IV -- PHOTOGRAPHS



Cartridge, 40-mm, High Explosive, M406 (left), and
Cartridge, 40-mm, Smokeless, Flashless, XM463 (right)

Figure 2

Cartridge, 40-mm, High Explosive, M406 (left) and
Cartridge, 40-mm, Smokeless, Flashless, XM463 (right).

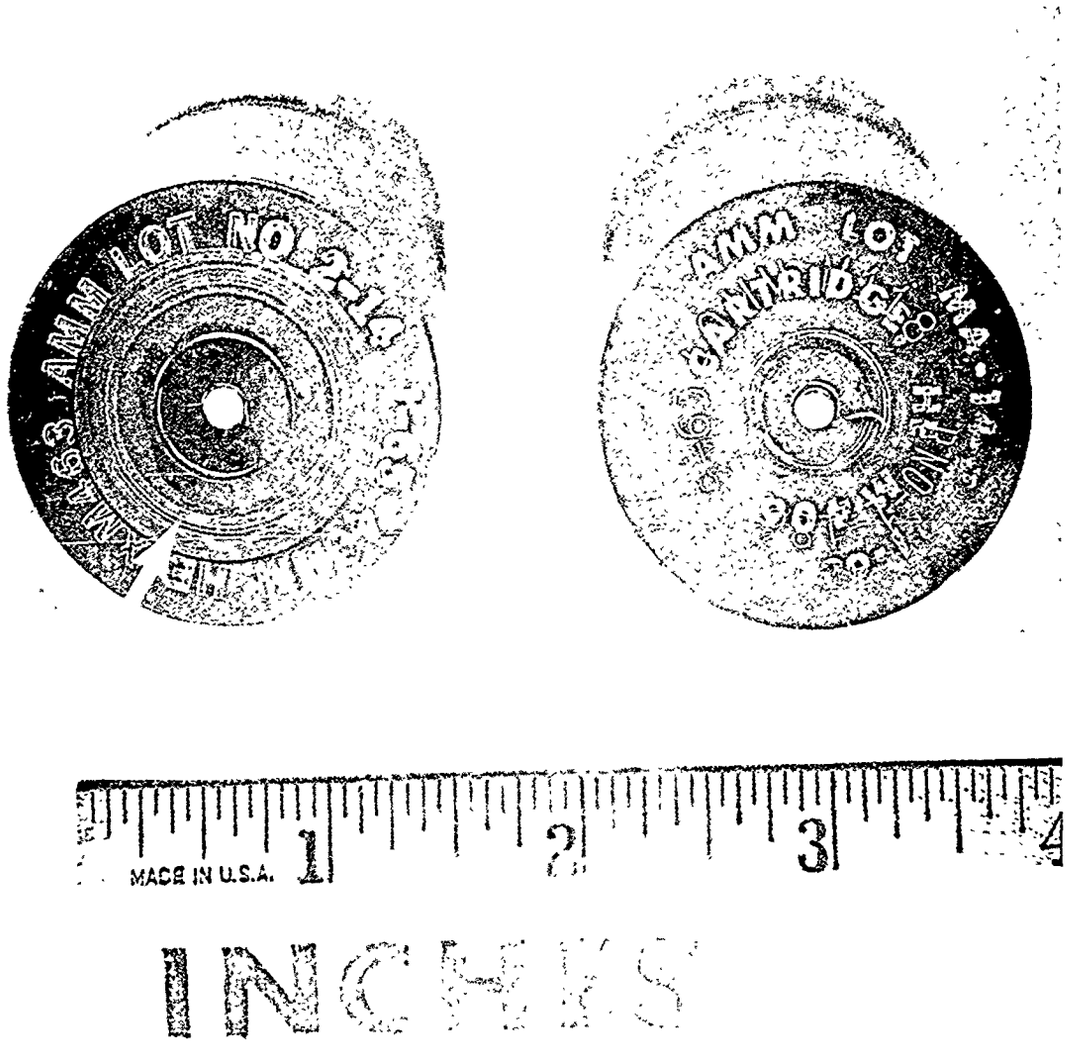


Figure 3

Cartridge, 40-mm, Smokeless, Flashless, XM463 with arrow indicating the groove in the base (left) and Cartridge, 40-mm, High Explosive, M406 (right).

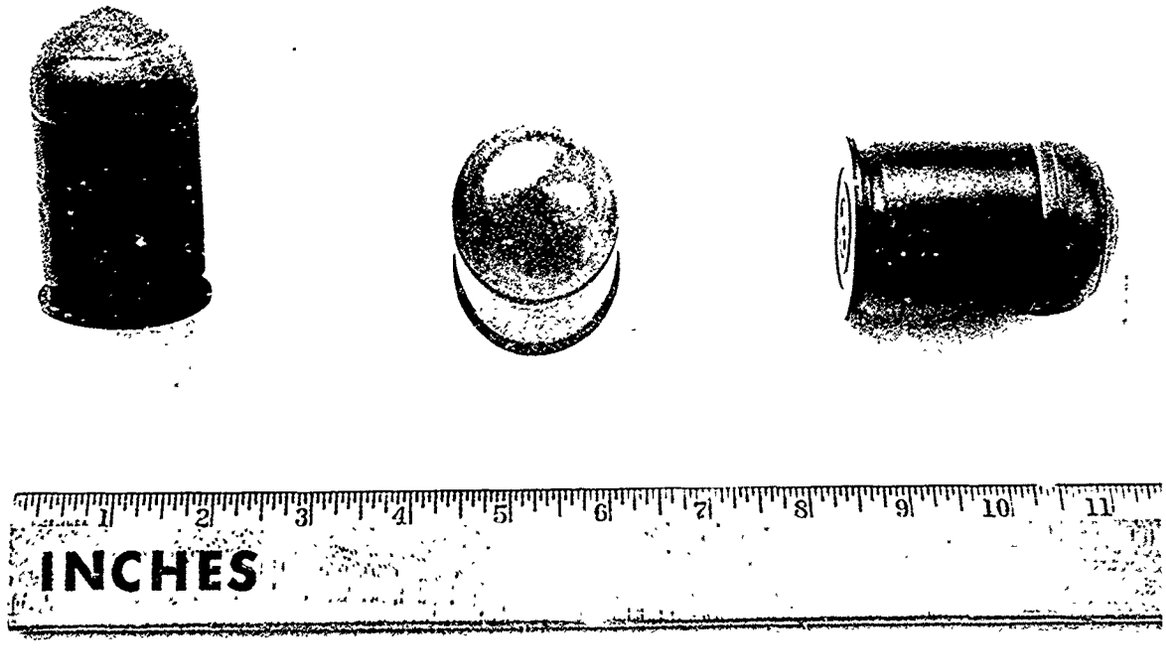


Figure 4

Expended Cases of Cartridge, 40-mm, Smokeless, Flashless, XM463.

Note: The expended case is easily distinguishable from an unexpended cartridge by the nickel color and pointed tip of the telescoped envelope and by its lesser weight.

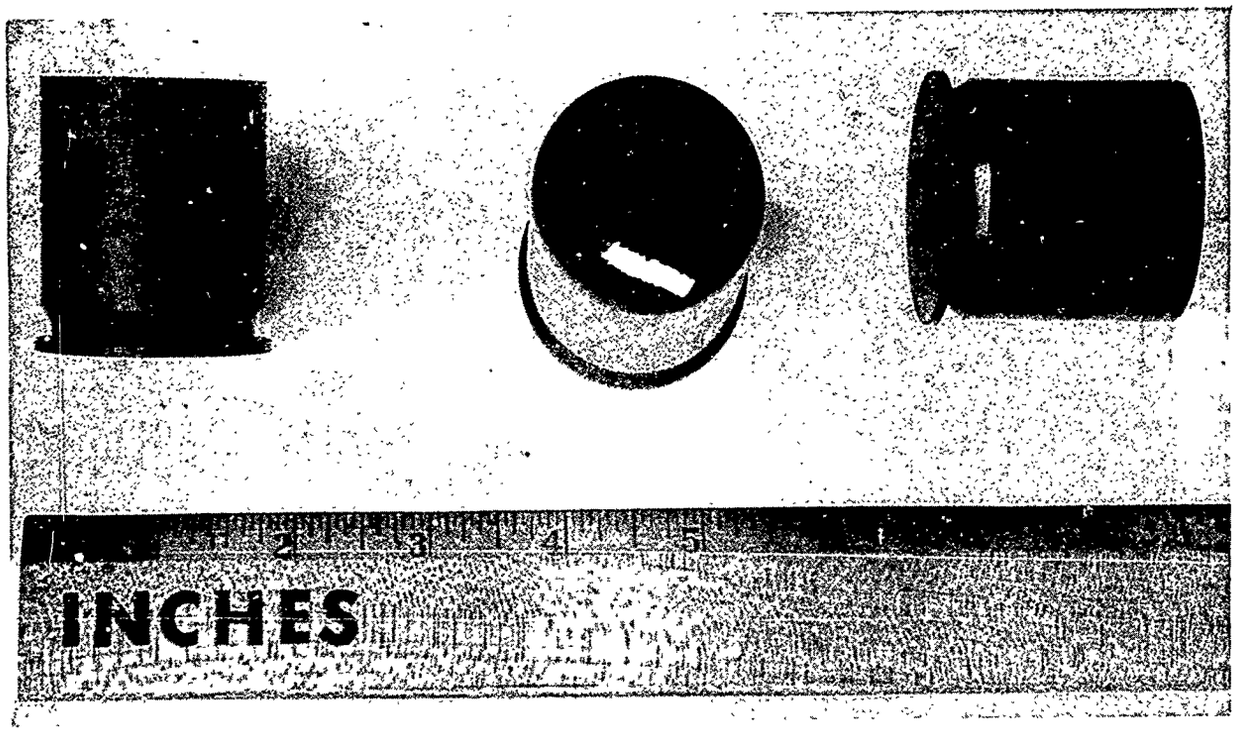


Figure 5

Expended Cases of Cartridge, 40-mm,
High Explosive, M406.

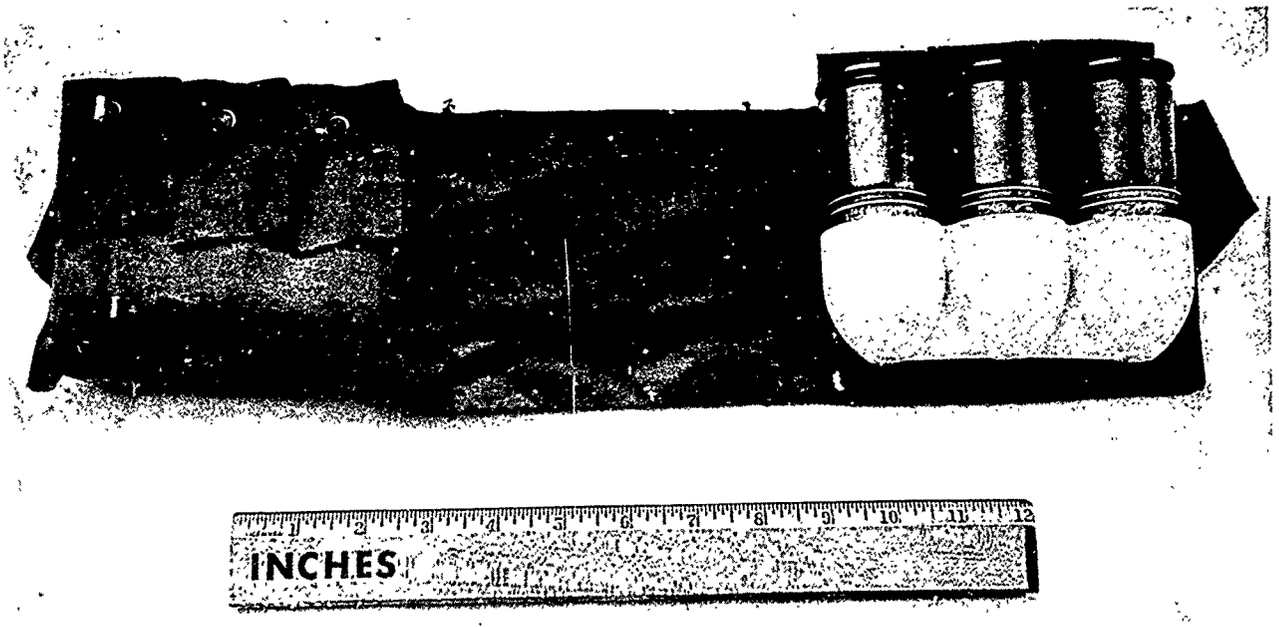


Figure 6

Bandoleer of Cartridge, 40-mm, Smokeless, Flashless, XM463.

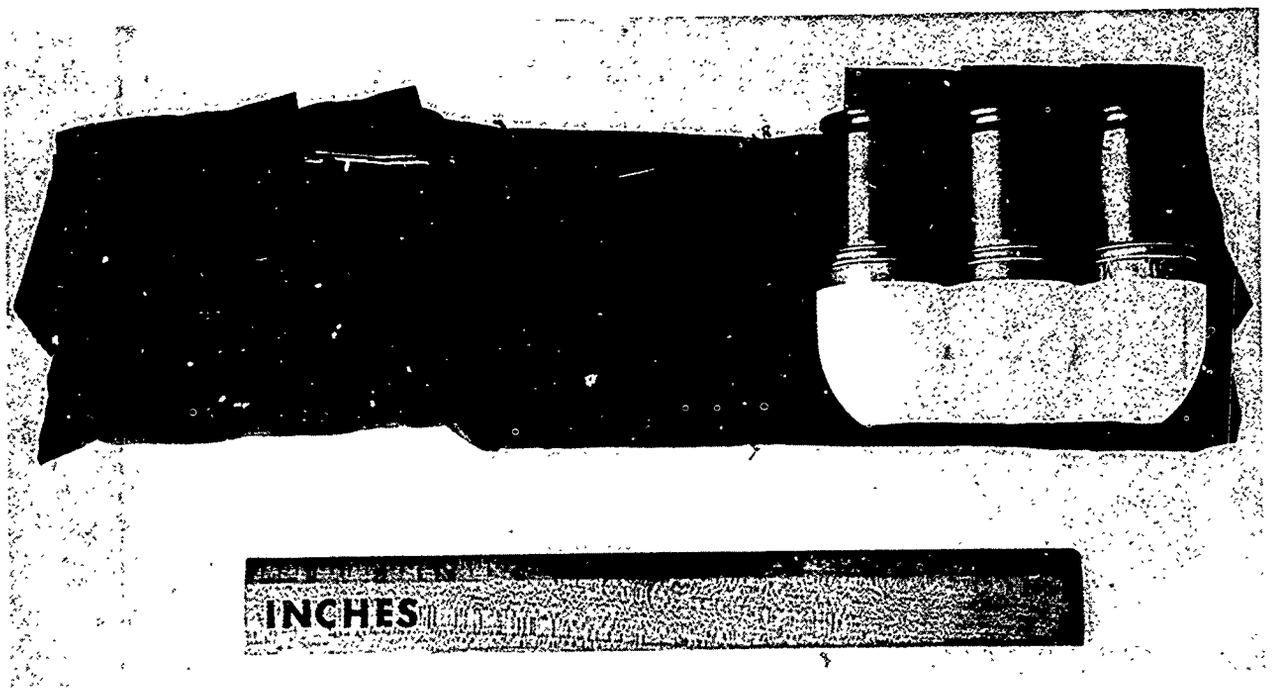


Figure 7

Bandoleer of Cartridge, 40-mm, High Explosive, M406.

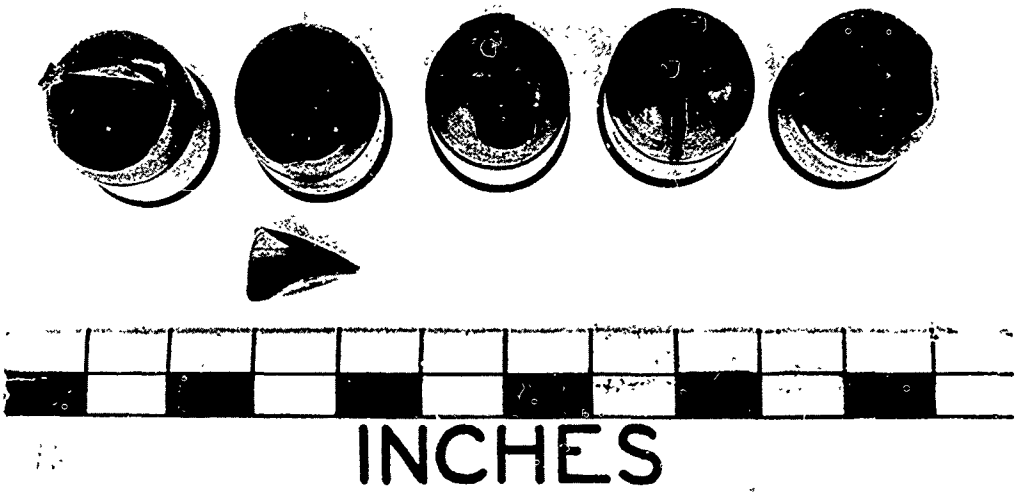


Figure 8

Burst Envelope of Cartridges, 40-mm,
Smokeless, Flashless, XM463.

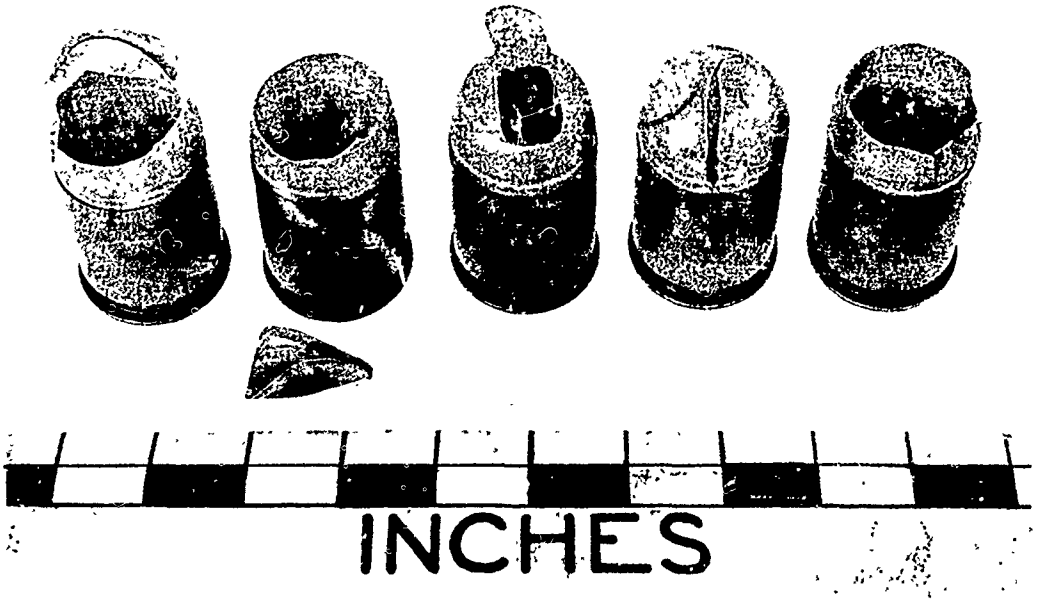


Figure 9

Burst Envelope of Cartridge, 40-mm, Smokeless, Flashless, XM463.

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AD_____Accession No_____

UNITED STATES ARMY INFANTRY BOARD, Fort Benning, Georgia
Report of USATECOM Project No 8-4-1060-03 (U), Service Test of Smokeless, Flashless, XM463, 40-mm Cartridge, 28 May 1965. 47 pages, 9 illus. CONFIDENTIAL. USAIB found that the test cartridge failed to meet all the requirements of the QMR, and concluded that the only appreciable advantage was a substantial reduction in position disclosing effects during darkness and no appreciable difference in accuracy, position disclosing effects during daylight,and was safe for army use; deficiencies were difficult extraction of expended test cartridges, not ballistically matched, not easily distinguishable during darkness, can be heard beyond minimum arming distance; shortcomings were excessive weight, maximum effective range, disclosure by smoke at 90 feet, and inadequacy of maintenance package. USAIB recommended that 500 modified test cartridges be made available for confirmatory testing.

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DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NEW JERSEY 07806-5000

AMSRD-DGC-B

15 Jun 12

MEMORANDUM FOR Headquarters, Defense Technical Information Center,
ATTN: DTIC-R (FOIA Progam Manager),
8725 John J. Kingman Road, Suite 0944,
Ft. Belvoir, VA 22060-6218

SUBJECT: Freedom of Information Act (FOIA) Request Review
DTIC File #: 2012-17 – Mr. Tom Tangen

1. The following reports were forwarded to this office for review and processing:

- Feb 68, Service Test of Practice Hand Grenade, XM52 with Fuze, XM225, AD0828910; and
- 2 Jun 65, Service Test of Smokeless, Flashless, XM463, 40-MM Cartridge, AD0368075

2. Our subject matter experts have determined that the reports are releasable to the public and have been provided to Mr. Tangen in their entirety.

3. I can be reached at (973) 724-6589, or via electronic mail at Kimberly.a.miller3@us.army.mil should you have any questions.

Kimberly Miller

KIMBERLY MILLER
Freedom of Information
Act Officer